

(57) Abstract: A steam trap mounting arrangement includes a mount body (70) that includes one or more integral flanges (76, 78). The flanges function as end fittings for associated ball valves (12, 24). The mount may be a single casting, such as a metal casting. The mount may further be a universal mounting that permits a plurality of different steam trap configurations to be installed thereon.

Steam Trap and Valve Mount Assembly

Related Applications

This application claims the benefit of pending United States Provisional patent application serial no. 60/320,258 filed on June 9, 2003 for INTEGRATED STEAM TRAP TEST ASSEMBLY, the entire disclosure of which is fully incorporated herein by reference.

Background of the Invention

[0001] A steam trap is an automatic valve designed to remove condensate, air, and CO₂ from a steam system. The trap opens automatically to discharge condensate and closes to prevent release of steam from the system.

[0002] A steam trap may be mounted on a universal mount, adapted to support steam traps of differing constructions made by differing manufacturers. In some steam systems a steam trap is located between two shutoff valves, for the purpose of testing the steam trap. The steam trap is tested by closing the downstream valve. If the trap is still good, condensate comes out of the vent of the downstream valve. If the trap has failed, steam comes out of the vent of the downstream valve. If the valve is determined to have failed, the upstream valve is closed to isolate the trap so that it can be replaced.

[0003] Valves that are sometimes used in this testing configuration are 60 series ball valves sold by Swagelok Company of Solon, Ohio, as shown generally in U.S. Patent No. 4,410,165, the entire disclosure of which is incorporated herein by reference. These ball valves have flanges on either end that together with a series of bolts, hold the ball valves together. The flanges provide a location for connection with the steam trap mount.

[0004] The steam trap mount is typically connected between the ball valves with a series of fittings and with tubing or NPT piping, to form a steam trap test valve assembly. One such prior art test valve assembly 10 is shown in Fig. 1.

[0005] The assembly 10 includes an upstream valve 12. The upstream valve 12 has a valve body 14, an inboard flange 16, and an outboard flange 18. Each one of the flanges 16 and 18 has a plurality of fastener openings 20 arranged in a predetermined pattern. A plurality of fasteners 22 extend through the fastener openings 20 in the flanges 16 and 18 to secure together the parts of the upstream valve 12.

[0006] The assembly also includes a downstream valve 24. The downstream valve 24 is similar in configuration to the upstream valve 12. The downstream valve 24 has a valve body 26, an inboard flange 28, and an outboard flange 30. Each one of the flanges 28 and 30 has a plurality of fastener openings 32 arranged in a predetermined pattern. A plurality of fasteners 34 extend through the fastener openings 32 in the flanges 28 and 30 to secure together the parts of the downstream valve 24.

[0007] The assembly 10 further includes a steam trap mount 40. The steam trap mount 40 may be a "universal" mount that is adapted to support steam traps of different configurations from different manufacturers. The mount 40 has a central body portion 42 with a mounting disk 44 that is adapted to support a steam trap (not shown).

[0008] The prior art test assembly 10 includes a plurality of fittings 46, and piping or tubing 48, connected between the upstream valve 12 and the steam trap mount 40. The prior art test assembly 10 also includes a plurality of fittings 50, and piping or tubing 52, connected between the downstream valve 24 and the steam trap mount 40. This can require a substantial amount of machining and a significant amount of labor to assemble.

Summary of the Invention

[0009] The invention contemplates a mounting arrangement for a steam trap that facilitates testing and use of the steam trap. In accordance with one aspect of the invention, a mount is provided that is adapted to have a steam trap installed thereon, and includes one or more flanges that form part of a valve. In one embodiment, the mount includes two flanges which respectively allow an upstream and downstream valve to be mounted thereon.

[0010] In accordance with another aspect of the invention, a steam trap mount is contemplated that includes one or more integral valve mounting flanges. The flanges function as end fittings for associated valves so as to eliminate intermediate fluid couplings between the valves and the mount. In one embodiment, the valves are ball valves.

[0011] In accordance with another aspect of the invention, a steam trap mount is contemplated that provides a universal mounting that allows a plurality of different steam trap mounting configurations to be installed thereon.

[0012] In accordance with another aspect of the invention, a steam trap mount is provided that is adapted to have a steam trap installed thereon and further includes one or more integral flanges, in which the mount comprises a single casting. In a further embodiment, the single casting comprises metal.

Brief Description of the Drawings

[0013] These and other aspects of the invention will be described herein and readily understood by those skilled in the art from a reading of the detailed description and the accompanying drawings wherein:

[0014] Fig. 1 illustrates a prior art steam trap mounting arrangement;

[0015] Fig. 2 illustrates a steam trap mounting arrangement in accordance with the present invention;

[0016] Fig. 3 is an isometric illustration of one embodiment of a steam trap mount in accordance with the invention; and

[0017] Fig. 4 is a top view of the embodiment of Fig. 3.

Description of the Invention

[0018] The present invention relates to a steam trap mounting arrangement and particularly to a mounting arrangement that facilitates valve installation with such an

arrangement. The complete assembly is especially useful for testing a steam trap in a steam system, although testing is not a requirement for the present invention. The assembly may be installed in a steam system and normally operates as a steam trap alone. When it is desired to test the steam trap, the assembly is operated as described above to determine whether the steam trap is still working or has failed.

[0019] A steam trap mounting arrangement in accordance with the invention may take many different forms, shapes or configurations. An exemplary embodiment of the invention is the steam trap assembly 60 shown in Fig. 2.

[0020] The assembly 60 includes a valve body 14 and an outboard flange 18 of an upstream valve 12. The assembly also includes a valve body 26 and an outboard flange 30 of a downstream valve 24.

[0021] The assembly 60 further includes a steam trap mount 70. The steam trap mount 70 may be but need not be a "universal" mount that is adapted to support a plurality of steam traps of different configurations, such as from different manufacturers. The mount 70 has a central body portion 72 with a mounting disk 74 that is adapted to support a steam trap (not shown). The mounting disk may have, for example, the same configuration as the mounting disk 42 of the prior art steam trap mount 40 that is shown in Fig. 1.

[0022] The mount 70 includes an upstream mounting flange 76 and a downstream mounting flange 78 that are located on opposite ends of the central body portion 72. The upstream mounting flange 76 has a plurality of fastener openings 80 arranged in a predetermined pattern. The pattern of the fastener openings 80 in the upstream mounting flange 76 of the mount 70 may be the same as the pattern of the fastener openings 20 in the inboard flange 16 (Fig. 1) of the upstream valve 12.

[0023] The downstream mounting flange 78 (Figs. 2-4) of the steam trap mount 70 has a plurality of fastener openings 82 arranged in a predetermined pattern. The pattern of the fastener openings 82 in the downstream mounting flange 78 of the mount 70 may be the same as the pattern of the fastener openings 32 in the inboard flange 28 (Fig. 1) of

the downstream valve 24. The downstream mounting flange 78 (Figs. 2-4) may be identical in configuration to the upstream mounting flange 76.

[0024] Because the pattern of the fastener openings 80 in the upstream mounting flange 76 of the steam trap mount 70 is the same as the pattern of the fastener openings 20 in the inboard flange 16 of the upstream valve 12, the mount 70 can be connected directly to the valve body 14 of the upstream valve, as shown in Fig. 2, replacing the inboard flange of the upstream valve. A plurality of fasteners 22 extend through the fastener openings 20 in the outboard flange 18 of the upstream valve 12, and through the fastener openings 80 in the upstream mounting flange 76 of the mount 70, to secure together the parts of the upstream valve 12. The fasteners 22 also secure the upstream valve 12 to the steam trap mount 70.

[0025] Similarly, because the pattern of the fastener openings 82 in the downstream mounting flange 78 of the steam trap mount 70 is the same as the pattern of the fastener openings 32 in the inboard flange 28 (Fig. 1) of the downstream valve 24, the mount 70 can be connected directly to the valve body 26 of the downstream valve, as shown in Fig. 2, replacing the inboard flange of the downstream valve. A plurality of fasteners 34 extend through the fastener openings 32 in the outboard flange 30 of the downstream valve 24, and through the fastener openings 82 in the downstream mounting flange 78 of the mount 70, to secure together the parts of the downstream valve 24. The fasteners 34 also secure the downstream valve 24 to the steam trap mount 70.

[0026] As such, each of the flanges 76 and 78 function the same as the end fittings of the valves 12 and 24. As end fittings (see for example the above patent incorporated herein by reference) the flanges are used to compress a valve seat against a portion of the associated valve body.

[0027] Because the mounting flanges 76 and 78 are preferably integrated into the steam trap mount 70, no extra pipes, tubes, or fittings are needed to connect the valves 12 and 24 with the steam trap mount 70. This eliminates the piping and fittings 46, 48, 50 and 52 that are needed in the prior art test assembly 10. This reduces significantly the

amount of labor and parts that are needed to produce the test assembly 60, thus lowering cost, as compared to the prior art test assembly 10 that is shown in Fig. 1.

[0028] By 'integrated' is simply meant that the flanges 76, 78 are joined to or part of the central body portion 72. The flanges may be attached to the central body by any suitable technique. In a preferred but not required embodiment, the mount 70 is realized in the form of a single casting, mold or similar structure. For example, the single casting may comprise a metal casting such as cast stainless steel. When formed as a single casting, the flanges 76, 78 are structurally integral and continuous with the central body.

Claims

Having thus described the invention, we claim:

1. A steam trap mount, comprising:

a main body adapted to have a steam trap mounted thereon;

at least one valve mounting flange integral with said main body, said valve mounting flange adapted to have a valve mounted thereon and wherein said valve mounting flange forms part of a valve when assembled thereto.
2. The mount of claim 1 wherein said valve mounting flange comprises an end fitting for a valve, said end fitting cooperating with a valve body and a second end fitting to enclose the valve when assembled.
3. The mount of claim 2 wherein the valve is a ball valve and said end fitting secures a ball element within said valve body.
4. The mount of claim 1 wherein said main body is adapted to be a universal mount for a plurality of different steam trap designs.
5. The mount of claim 1 wherein said valve mounting flange can be bolted to a valve body to enclose a ball element therein.
6. The mount of claim 1 wherein said main body and flange comprise a single casting.
7. The mount of claim 6 wherein said casting comprises cast metal.
8. A steam trap and valve mount assembly, comprising:

a steam trap;

a mounting body with said steam trap mounted thereon;

at least one valve mounting flange integral with said main body;

at least one valve mounted on said valve mounting flange;

said valve mounting flange forming part of said valve when assembled therewith.

9. The assembly of claim 8 wherein said valve comprises a ball valve; said flange functioning as an end fitting for said ball valve.

10. The assembly of claim 9 wherein said end fitting cooperates with a valve body and another end fitting to enclose said valve.

11. The assembly of claim 10 wherein said ball valve comprises a ball seat that is compressed between said flange and a portion of said valve body.

12. The assembly of claim 8 comprising a second valve installed on said mounting body; said mounting body comprising a second mounting flange with said second valve mounted thereon.

13. The assembly of claim 12 wherein said valves are mounted on opposite sides of said mounting body.

14. The assembly of claim 8 wherein each said valve comprises an axis of flow therethrough, said valves being installed on said mounting body so that said valve flow axes are coaxial.

15. The assembly of claim 12 wherein said valves operate to function as a test assembly for said steam trap.

16. The assembly of claim 8 wherein said mounting body and flange comprise a single casting.

17. The assembly of claim 16 wherein said single casting comprises cast metal.

18. The assembly of claim 8 wherein said main body is adapted to be a universal mount for a plurality of different steam trap designs.

19. A steam trap mount and valve assembly, comprising:

a mounting body adapted to have a steam trap mounted thereon;

at least one valve mounting flange integral with said main body;

at least one valve mounted on said valve mounting flange;

said valve mounting flange forming part of said valve when assembled therewith.

20. The assembly of claim 19 wherein comprising two valve mounting flanges and a respective valve mounted on each flange.

21. The assembly of claim 19 wherein said mounting body and flange comprise a single casting.

22. The assembly of claim 21 wherein said single casting comprises a metal casting.

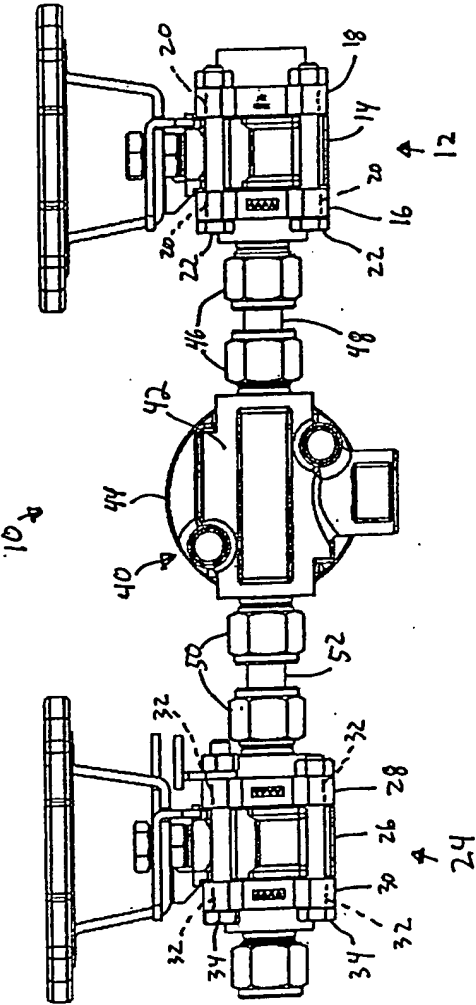
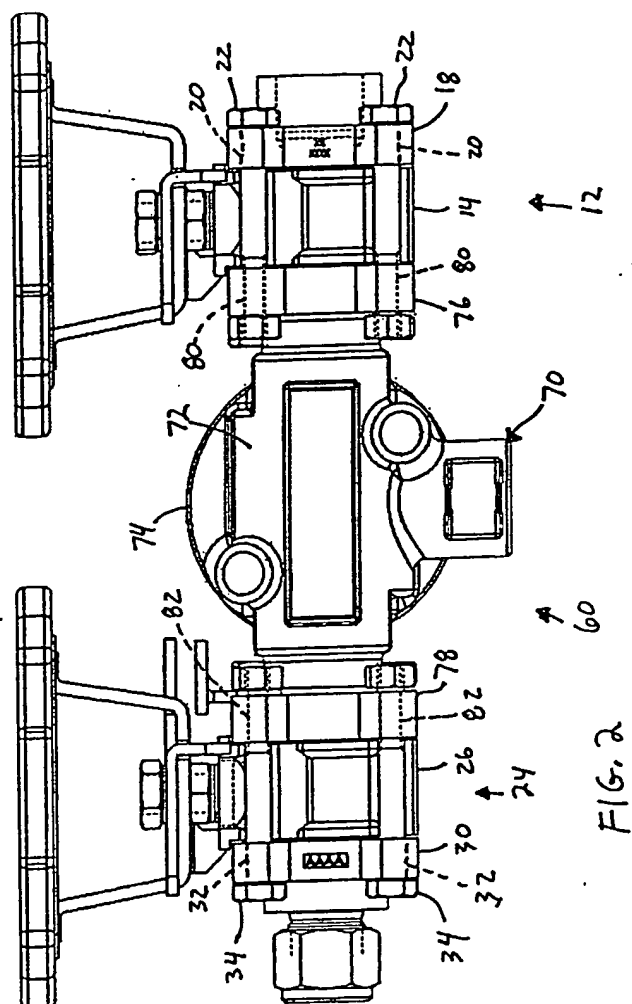


FIG. 1 - PRIOR ART



F16.2

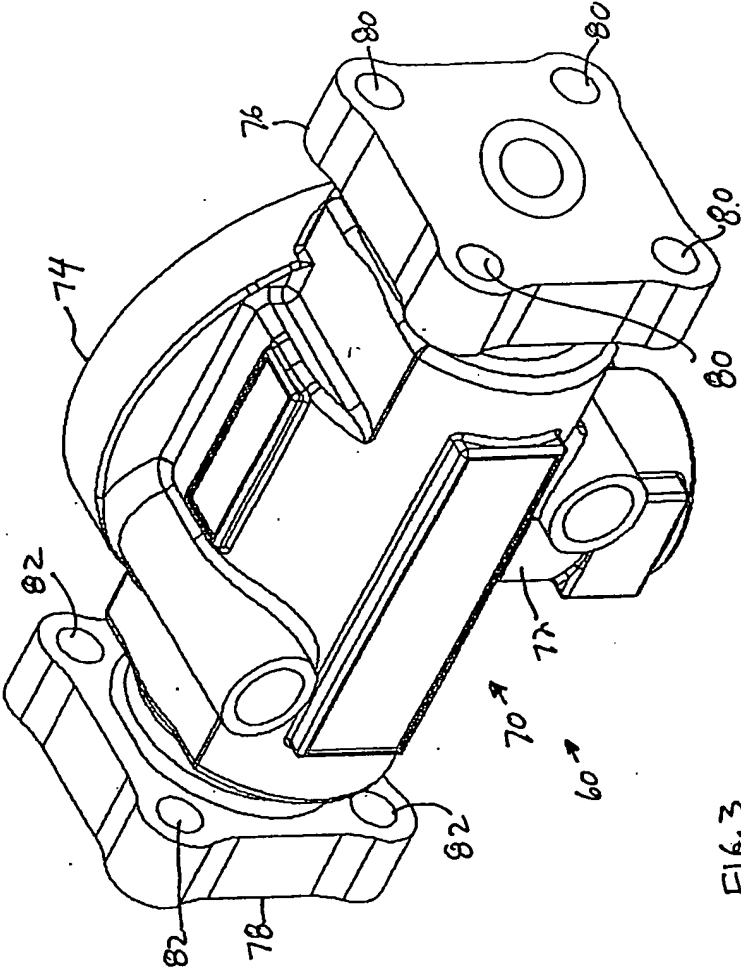


FIG. 3

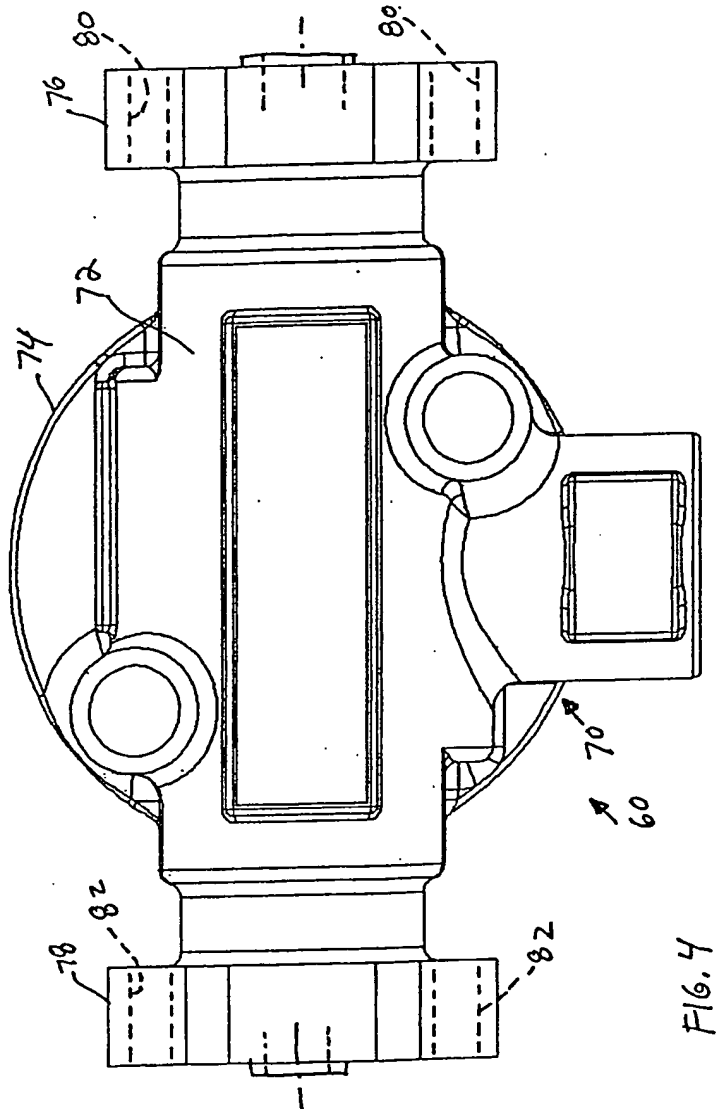


FIG. 4

INTERNATIONAL SEARCH REPORT

International Application No
PCT/US2004/018102

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 F16T1/38

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 F16T

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the International search (name of data base and, where practical, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 546 976 A (FARQUHAR KEITH) 20 August 1996 (1996-08-20) column 2, line 36 - column 4, line 40; figures	1-22
X	US 5 881 766 A (SCHLESCH RONALD D ET AL) 16 March 1999 (1999-03-16) column 3, line 4 - column 8, line 31; figures	1,4,6-8, 12,13, 15-22
A	BE 456 435 A (GERDTS GF) 31 July 1944 (1944-07-31) figure 4 -/-	1,2,6-8, 12-14, 16,17, 19-22

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents:

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

T later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

X document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

Y document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

G document member of the same patent family

Date of the actual completion of the international search

26 October 2004

Date of mailing of the international search report

03/11/2004

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax (+31-70) 340-3016

Authorized officer

Lanel, F-B

INTERNATIONAL SEARCH REPORT

International Application No
PCT/US2004/018102

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	FR 1 385 030 A (BASF AG) 8 January 1965 (1965-01-08) figures	1,2,4, 6-8, 16-22
A	US 6 148 845 A (BOROWSKI RALF) 21 November 2000 (2000-11-21) figures 1-4	1,2,4,5, 8,18,19
A	US 4 410 165 A (KOCH ULRICH H ET AL) 18 October 1983 (1983-10-18) cited in the application figures	1-3,5, 8-15,19, 20

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US2004/018102

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 5546976	A	20-08-1996	DE 4423363 A1 JP 7208700 A	13-07-1995 11-08-1995
US 5881766	A	16-03-1999	US 2002100509 A1	01-08-2002
BE 456435	A		NONE	
FR 1385030	A	08-01-1965	DE 1261126 B	15-02-1968
US 6148845	A	21-11-2000	DE 19815340 A1 CA 2267578 A1 EP 0949446 A2 ZA 9902508 A	07-10-1999 06-10-1999 13-10-1999 15-11-1999
US 4410165	A	18-10-1983	AU 558174 B2 AU 1098083 A BE 895927 A1 CA 1192533 A1 DE 3305193 A1 DK 65483 A FR 2521678 A1 GB 2114716 A ,B IE 54011 B1 IT 1164872 B JP 58166174 A NL 8300559 A NO 830514 A ,B, SE 449394 B SE 8300800 A US 4602762 A	22-01-1987 04-12-1986 16-06-1983 27-08-1985 25-08-1983 17-08-1983 19-08-1983 24-08-1983 10-05-1989 15-04-1987 01-10-1983 16-09-1983 17-08-1983 27-04-1987 17-08-1983 29-07-1986